Black Box Corporation
The World's Source for Connectivity™

Compact Media Converter
Installation Guide

LHC001A - LHC002A - LHC003A
LHC004A - LHC005A - LHC006A

Black Box's ***Compact Media Converter*** is a low-cost, preconfigured, IEEE 802.3 single-conversion media converter that converts between 100Base-TX twisted pair and 100Base-FX multi-mode or single-mode fiber. It is available with one RJ-45 connector for the twisted pair port and one pair ST or SC connectors for the fiber port.

Compact Media Converter is a 1U high, standalone unit that includes diagnostic LEDs for each port and a universal (100-240 VAC) power supply. The following ***Compact Media Converter*** versions are available:

100B TX - 100B FX — 100Base-TX twisted pair/100Base-FX 1300 nm multi-mode fiber; includes one RJ-45 connector and one pair ST (LHC001A) or SC (LHC002A) connectors

100B TX - 100B FX SM — 100Base-TX twisted pair/100Base-FX 1300 nm single-mode fiber; includes one RJ-45 connector and one pair ST (LHC003A) or SC (LHC004A) connectors

100B TX - 100B FX SM/PLUS — same as above with higher power budget; includes one pair ST (LHC005A) or SC (LHC006A) connectors

Installing Compact Media Converter

Compact Media Converter comes ready to install. The only adjustments that may need to be made come after installation.

To install ***Compact Media Converter***, first make sure that the unit is placed on a suitable flat surface. Attach the cables between the ***Compact Media Converter*** and each device that will be interconnected, then plug the unit into a reliable, filtered power source.

Configuring *Compact Media Converter*

The following diagram shows the switches and connections on ***Compact Media Converter.***

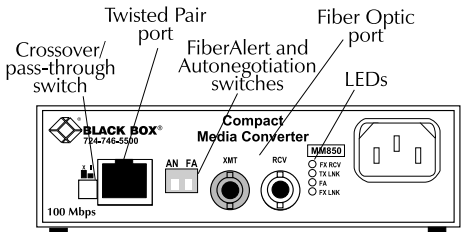


Figure 1: Compact Media Converter TX/FX, Front View

Once installed, you can configure ***Compact Media Converter*** for the following:

- Select a crossover or pass-through connection for the twisted pair port (default = OUT/crossover)
- Enable ***Auto-Negotiation*** (default = DOWN/disabled)
- Enable ***FiberAlert*** (default = DOWN/disabled)

Note: LinkLoss ***is an additional feature that can be enabled before installation.***

LinkLoss ***is disabled as a factory default. See Enabling and Using*** LinkLoss ***for more information.***

Twisted Pair Crossover/Pass-Through Switch

The twisted pair port on ***Compact Media Converter*** has one RJ-45 connector for a single shielded or unshielded twisted pair link segment, and features a push-button switch, located next to the twisted pair connector, for selecting a crossover workstation connection or pass-through repeater/hub connection. Select a pass-through connection by pressing the push-button IN. A crossover connection is selected when the push-button is OUT.

If uncertain whether a crossover or pass-through connection is needed, set the push-button to the position that makes the link LED glow.

About *FiberAlert* and *LinkLoss*

Compact Media Converter comes with the following troubleshooting features:

- ***FiberAlert***
- ***Twisted Pair LinkLoss*** (a.k.a. "***TX LinkLoss***," or just "***LinkLoss***")
- ***Fiber LinkLoss*** (a.k.a. "***FX LinkLoss***")

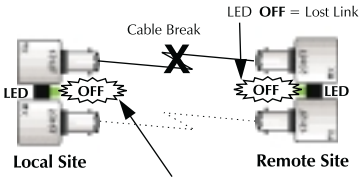
FiberAlert and ***LinkLoss*** are advanced troubleshooting features that can help you locate "silent failures" on your network. However, it is vital that you understand exactly how ***FiberAlert*** and ***LinkLoss*** work, and how they will react in your network configuration, before attempting to install the enclosed module(s). **Installing modules without understanding the effects of *FiberAlert* and *LinkLoss* can cause perfectly functioning units to appear flawed or even dead!**

If you are unfamiliar with ***FiberAlert*** and ***LinkLoss***, the manufacturer strongly encourages you to read the following information.

About Link Integrity

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When a ***Compact Media Converter*** receives valid link pulses, it knows that the device to which it is connected is up and sending pulses, and that the copper or fiber cable coming from that device is intact. The appropriate "LINK" LED is lit to indicate this. The ***Compact Media Converter*** also sends out link pulses from its copper and fiber transmitters, but normally has no way of knowing whether the cable to the other device is intact and the link pulses are reaching the other end. The combination of ***FiberAlert*** and ***LinkLoss*** allows this information to be obtained, ***even when physical access to a remote device (and its link integrity LED) is not available.***

What Is *FiberAlert*?



FiberAlert lets you know when a fault occurs on your fiber loop by stopping data transmissions and affecting fiber LEDs on both sides of your network. If a media converter is not receiving a fiber link, ***FiberAlert*** disables the media converter's fiber transmitter, thus mirroring the link status of the opposite end of the fiber. Both fiber link LEDs on either end of the link should extinguish, alerting you to the fault.

Using ***FiberAlert***, a local site administrator is notified of a fault and can quickly determine where a cable fault is located without having to go to the remote site.

NOTE: **FiberAlert** ***should only be enabled on one side of a media conversion. Enabling it on both sides would keep both transmitters off indefinitely.***

What Is *Twisted Pair LinkLoss*?

Twisted Pair LinkLoss (a.k.a. "***LinkLoss***") functions much like ***FiberAlert*** in that faults on one port are mirrored on the other. In the case of ***LinkLoss***, however, a fault on the fiber port is passed to the Ethernet twisted pair port.

FiberAlert/LinkLoss Compared

Feature	Fault Location	Disabled LEDs
FiberAlert	Fiber	Fiber
TX LinkLoss	Fiber	Twisted Pair
FX LinkLoss	Twisted Pair	Fiber

If a media converter is not receiving a fiber link, ***LinkLoss*** disables the transmitter on the media converter's twisted pair port. This results in a loss of link on the remote twisted pair device.

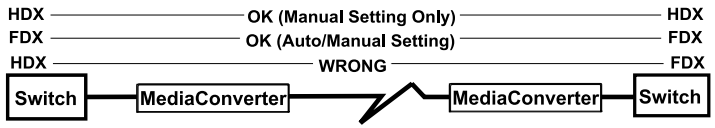
What Is *Fiber LinkLoss*?

Fiber LinkLoss lets you know when a fault occurs on the twisted pair portion of your network by affecting the fiber link LED on the remote fiber device. When the twisted pair port on the media converter is not receiving a link pulse, ***Fiber LinkLoss*** turns off the media converter's fiber transmitter. This results in a loss of fiber link to the remote fiber device (media converter, switch, fiber hub, etc.), which extinguishes its LED, thereby letting you know that a fault exists

Auto-Negotiation on Compact Media Converter

Auto-Negotiation is available on ***Compact Media Converter***. When ***Auto-Negotiation*** is enabled, the media converter negotiates as a 100 Mbps Full-Duplex device; if the device the ***Compact Media Converter*** is connected to can operate at 100 Mbps Full-Duplex, a link will be established.

If the twisted pair port on the other device does not have the ability to auto-negotiate, or if a 100 Mbps Half-Duplex connection is desired, ***Auto-Negotiation*** on ***Compact Media Converter*** must be disabled. Half- and Full-Duplex settings must be manually set and match on both devices to which ***Compact Media Converter*** is connected. The diagram below shows a typical application, followed by a table with three possible configurations.



End to End Connection	Switch	TX/FX
Half-Duplex	Manually configure HDX	Auto-Negotiation Off
Full-Duplex	Manually configure FDX	Auto-Negotiation Off
Full-Duplex	Auto-Negotiation On	Auto-Negotiation On

Enabling FiberAlert and Auto-Negotiation

FiberAlert and ***Auto-Negotiation*** are each configured on ***Compact Media Converter*** by adjusting a two-position switch on the faceplate next to the fiber connectors. The switch for ***FiberAlert*** is labeled "FA" and ***Auto-Negotiation*** is labeled "AN." Enable these features by moving the corresponding switch to the up (ON) position. Disable (default) by moving the switch to the down (OFF) position.

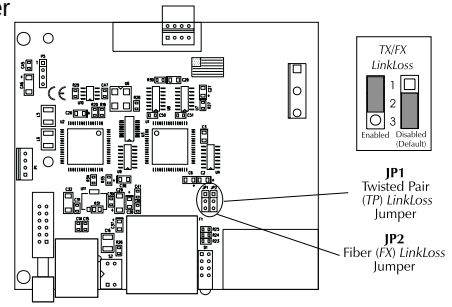
Enabling *TX* and *FX LinkLoss*

In order to enable these functions, you will need to remove the cover from the unit and place the jumpers accordingly. Follow these instructions:

1) Make sure that there is no power going to the unit by UNPLUGING THE POWER CORD!

2) Using a phillips screwdriver, remove the screws on the corners of the cover.

3) Remove the cover. After doing so, find the three-pin jumpers ***JP1*** and ***JP2***. ***JP1*** toggles the ***TX LinkLoss*** feature and ***JP2*** toggles the ***FX LinkLoss*** feature. See Figure 2 for location and settings.



4) Replace the cover and tighten the screws to secure the cover.

JUMPER CONFIGURATION CHART

Feature	Jumper Position	ON (pins)	OFF (pins)	Factory Default
TX LINKLOSS	JP1	1-2	2-3	Off
FIBER LINKLOSS	JP2	1-2	2-3	Off

Using FiberAlert and LinkLoss

In a typical central site to remote site media conversion, the manufacturer recommends you enable your media converters' troubleshooting features as follows:

FiberAlert: Remote Site Only
TX LinkLoss: Main and Remote Site
FX LinkLoss: Remote Site Only

This will ensure that any faults, no matter where they occur, can be detected by an administrator located at the central site.

Installation Troubleshooting

- During installation, first test your fiber and twisted pair connections with all troubleshooting features disabled. Then enable these features, if desired, just before final installation. This will reduce the features' interference with testing.

- To test ***Compact Media Converter*** by itself, you must have an appropriate fiber patch cable. First, connect ***Compact Media Converter*** to the twisted pair device with a twisted pair cable. Next, loop a single strand of fiber from the transmit port to the receive port of your media converter. Finally, verify that you have both twisted pair and fiber link on your ***Compact Media Converter***.
- Make sure that you are using the appropriate twisted pair cable or have the crossover/pass-through button on the ***Compact Media Converter*** set correctly.

LED Operation

Compact Media Converter features four diagnostic LEDs. They are:

FX RCV	Blinks yellow when module is receiving data.
TX LNK	Glows green when a twisted pair link is established.
FA	Glows green when ***FiberAlert*** is enabled.
FX LNK	Glows green when a fiber link is established.

Specifications

Environmental

Operating Temperature: 32° - 104° F (0° - 40° C)
Storage Temperature: 20° - 160° F (-20° - 70° C)
Humidity: 5 - 95% (non-condensing)

Power

AC Input Load: 100/240V± ~ 50/60 Hz, 0.1/0.05A
Heat generated: 25 BTU/hr.

Dimensions

1.50"H x 4.65"W x 4.43"D (3.8 cm x 11.8 cm x 11.3 cm)
1.3 lbs. (0.6 kg)

Black Box Customer Service Information

CALL: **(724) 746-5500** 7 a.m. Monday to midnight Friday; 8 a.m. to 4 p.m. Saturday (EST)

FAX: **(724) 746-0746** 7 a.m. Monday to midnight Friday; 8 a.m. to 4 p.m. Saturday (EST)

Mail Order: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018

Technical support, phone and fax orders 24 hours a day.

Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1) Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.
2) Dust caps are installed by the manufacturer to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Assure that the fiber is properly terminated, polished and free of any dust or dirt, and that the location is as free from dust and dirt as possible.
3) Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.
4) Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.
5) If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to your add-in modules. Always observe the following precautions when installing or handling an add-in module or any board assembly.

1) Do not remove unit from its protective packaging until you're ready to install it.
2) Wear an ESD wrist grounding strap before handling any module or component. If you do not have a wrist strap, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.

WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

3) Hold boards by the edges only; do not touch the electronic components or gold connectors.
4) After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the board over any surface.

Please contact Black Box for complete warranty, FCC and Safety Certification information.

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